Correspondence.

The Cause of Consumption.

To the Editor of the Scientific American:

In your editorial of May 31 upon my views of the cause of consumption you say: "Regular physicians will be apt to say" I have "mistaken a condition for a cause." That such a mistake might be made upon so complicated a subject is no doubt a natural inference, and I do not write to complain of it—far from that—but to call attention to a few facts which show how little chance there is to make a mistake in this important matter.

I cannot see, for instance, how it is possible to mistake a condition for a cause in consumption any more than in Bright's disease, with that feature of either disease that is identical in both; that is to say, it is difficult to see how the loss of albumen from the blood through the kidneys, in Bright's disease, can be considered the cause of the disease, while an equal or greater loss of albumen from the blood through the lungs, in consumption, should be held to be only a condition of that disease. The mistake would certainly be in divorcing the two losses in that way, and say that the waste of identically the same element from the blood meant one thing in the one disease and an entirely different thing in the other.

The entire medical profession of all schools, and without exception, stands committed to the teaching that a discharge of albumen from the kidneys is the cause and the only cause of Bright's disease, and of all that follows in those cases up to and including death; also, that it is one of the most fatal of all diseased conditions. And the fact that all of the albumen so discharged is a direct waste or loss of just so much of it from the blood is proved by the following from Carpenter's "Physiology," page 189, where, in speaking of Bright's disease, he says:

"According to Andral the diminution in the amount of albumen in the serum is exactly proportional to the quantity contained in the urine."

Language could not be more definite and positive than that. There never was a case of Bright's disease without the discharges from the kidneys containing albumen. That constitutes the disease. It is the first, the last, and the only symptom, with barely one minor exception, viz., fibrinous casts of the uriniferous tubules, by which the disease is known or can be recognized with certainty to exist during the lifetime of the patient. All other manifestations of the disease are common to several other diseases.

With consumption also the very first departure from health is a discharge of albumen through or from some one or more of the organs lined with a mucous membrane, more gene rally of course from the air passages; still many cases are commenced by a waste of albumen through and in consequence of chronic irritations and abrasions of the mucous membrane of the stomach, of the bowels, or of the genital organs of females, until the system is exhausted to a certain extent, when in many of these cases the disease will leave those parts and be transferred to the lungs, or be driven to them by wrong treatment, there to complete its final work. The waste of albumen continues, too, in all cases of consumption, and generally in an increasing quantity, to the close of life; so it is the first and among the last symptoms of the disease, but by no means the only certain indication of it, as in Bright's disease. Indeed, consumption has ever, hitherto, been recognized solely by other symptoms and appearances, and the fact of the loss of albumen has never before been taken into consideration as a constant attendant of the disease, much less has it ever before been even suspected of being the true and only cause of it. But there never would have been and never could be a case of consumption but for the waste of albumen, any more than there could be a case of Bright's disease without that.

And that the appearance of albumen in the discharges in all these cases is a loss or waste of just so much of it from the blood, the same as in Bright's disease, is a self-evident fact, for there is no other possible source from which it can be drawn but from the blood.

Again, never a case of consumption occurred without the blood becoming too watery long before tubercles began to organize, and getting more and more watery as the case went on and the waste of albumen increased; and nothing causes this too watery condition of the blood but the loss of albumen therefrom, excepting with those in poverty, who are compelled to live on too watery food, or that which does not contain sufficient albumen. And here it may as well be said that nothing is food for man that does not contain considerable albumen; and that which contains the most of it, other things being equal, is by far the best.

To recapitulate the main facts in this subject, then, so that any intelligent mind will be able to grasp it as a whole: The first departure from health in consumption is marked by a waste of albumen, always from the blood, and the increase in severity of any and all symptoms of the disease is marked by an increasing waste of albumen; the watery condition of the blood is solely due to such waste, and the blood becomes more watery as the waste becomes greater, because of the increasing relative excess of water left in the blood vessels by it; this excess of water causes the night sweats and dropsy, which get worse as the loss of albumen increases; the blood corpuscles left in excess are decolorized by circulating in the too watery serum and become the so-called tuberculous corpuscles, which also increase in numbers as said loss progresses; the excess of fatty matters causes the fatty livers, etc.; the excess of fibrin causes the adhesions of the pleura, which become more and more extended as the cause of all advances; the same general fact holds in regard to the excess of salts producing their characteristic troubles, which increase with all else; and finally, the characteristic emaciation of consumption keeps exact pace with the waste of albumen; when this progresses slowly that progresses slowly, when this goes on rapidly that goes on rapidly, for the simple reason that the muscles are being robbed of a portion of their only food, and must shrivel in the exact ratio that that is taken from them.

By such a presentation of the facts of the case I trust all will now be enabled to see how almost impossible it is to make any great mistake upon any point in this subject; also that every part of it is so intimately and inseparably connected with every other part, that it must be considered as a whole, if we would deal intelligently with it. And this leads me to call attention, in conclusion, to the fact that, as you inferred at the close of your editorial, the treatment of consumption must be radically changed in almost all respects to correspond with the real cause, and with this great chain of events as they naturally occur in the disease, or there is no hope of the profession ever doing any more in the future than it has in the past in mastering this greatest of all the scourges of mankind.

ROLLIN R. GREGG, M.D.

Buffalo, N. Y., June 10, 1879.

ENGINEERING INVENTIONS.

Mr. W. H. Maple, of Chariton, Iowa, has recently patented an improved car coupler, which employs a combined link and pin. It is certainly very simple, and it appears to be a safe and practical device. It is operated from the side of the car, thereby avoiding the accidents common to the old link and pin coupling.

An improvement in drill jars, consisting in forming the links with rounded outer and inner surfaces and cylindrical anvils or striking heads, arranged inside at the ends of the links to receive the impact when the drilling tool is lifted, has been patented by Mr. J. E. Hughes, of Barnhart's Mills, Pa.

An improvement in hand and horse power fire engines has been patented by Mr. A. S. Walbridge, of Mystic, Quebec, Canada. Three or more pumps are arranged radially around a vertical shaft, and operated by a single crank. The shaft is fitted with a hub for carrying sweeps, so that it may be driven by hand or horse power.

An improved centrifugal ore pulverizer and separator has been patented by Alexander Goodhart, of Carlisle, Pa. The invention relates to the construction of a cylinder, into which the ore matter is first received, and in which it receives a preliminary pulverizing. This cylinder is surrounded by another cylinder, that revolves in the opposite direction, and completes the pulverizing process.

Mr. Sylvanus B. Nickum, of Jalapa, Ind., has patented an improved railroad switch, which may be operated from the locomotive or from the rear car of the train. The switch rails are operated by a lever, which is pivoted to one of the ties, and is engaged by a pin on the locomotive or car, the pin being arranged so that it may be dropped down into position to engage the lever or raised up out of the way.

Henry Reese, of Baltimore, Md. (not Ruse, as given in a recent issue), has patented in this country, a railway cross-tie, of wrought iron, to which the rails are fastened by means of a permanent lug and removable clamp at each end of each tie. Both lugs face toward the same end of the tie, and the alternate ties are reversed end for end, so that the permanent lugs alternate on opposite sides of the base flanges of the rails. The movable clamp is held to its place by a simple form of spring, which takes up all wear and keeps the fastening tight and rigid. Patents are pending for the same invention in several European countries.

The Steam Engine of the Future.*

In the form of a pamphlet the well known author of many valuable works on the steam engine has now given forth some admirable suggestions, and sensible previsions, as to the future of the wondrous machine. We shall at present content ourselves with allowing Mr. Bourne to speak for himself on this pregnant subject. He observes that "the benefit of working steam engines expansively is well known to engineers, as also the necessity of employing a steam jacket in engines so worked, to obtain the full benefit of the expansive principle. It is not generally known, but is nevertheless the fact, that in high speed engines there is a further benefit arising from the inability of the cylinder to become sensibly heated and cooled at each stroke, from the shortness of the time given for that process, and in such engines the cylinder approaches to the condition of a non-conductor, which is known to be favorable to the economical generation of power. Then, in the case of all high pressure engines, it is easy to see that a considerable pressure must be more beneficial than a lower pressure. To raise a given quantity of water into steam takes just the same quantity of heat, whether the evaporation is effected at the pressure of the atmosphere or at six or eight times that pressure. But at the low pressure the steam will not generate any power, whereas at the high pressure it will generate much power. A very high pressure of steam, however, is inconvenient, as it involves a correspondingly strong and heavy boiler, an extra strong and heavy engine, and separate expansion gear, which is not compensated by the small amount of increased economy obtained from excessive pressure. I have found a pressure of about eight atmospheres to be, on the whole, the most eligible that can be adopted. . . .

"Supposing a good and cheap small engine to be available—an engine that will be strong, simple, safe, light, noiseless, and economical in fuel—not only would all its industrial applications be extended, but it would find a new and wide sphere of usefulness in ministering to domestic wants, one of the most widely pervading of which is the want of a simple motive power. In American hotels steam engines have long been employed for brushing boots and cleaning knives. They are the docile and inexpensive Helots of the age, and the domestic production of the electric light is a new and important sphere for their energies. But besides these functions, a domestic engine may be employed in roasting meat, driving washing machines and mangles, driving sewing machines, in brushing hair, in preparing aerated waters, and in the country for pumping, for sawing wood, and for performing many other laborious operations. A steam engine may be made to cool houses in summer and to warm them in winter, to maintain fountains in conservatories, to work punkas, to produce ice, and to create and maintain a vacuum in safes for the preservation of meat. For such purposes the engine must obviously be of the simplest, most compact, and most inexpensive character, and should be attached to the boiler, so that the whole may be lifted in a piece, like a hall stove. The boiler should be provided with a self acting feed of water, and the fuel should be gas, which has only to be lighted to enable the engine to be put into operation. Gas companies will find ample compensation for the loss of their lighting function in the creation of a new heating function, which will become larger and more remunerative than the lighting has ever been. Instead of extracting from the coal only the illuminating gases, the whole fuel should be turned into combustible gas by the aid of superheated steam, and all the fires of houses could be maintained by this cheap gas burning in jets amid pumice, which it would keep red hot. There would then be neither dust from grates nor smoke from chimneys, and the gas-works would supply the fuel that is necessary for the generation of the electric light.

"I cannot pretend in this brief notice to enumerate all the improvements which the steam engine of the future should comprehend; but one essential quality is, that the boiler shall not be liable to internal incrustation, and that there shall be abundant facilities for easily cleaning it out. Most waters contain a certain proportion of lime, which is precipitated by boiling, and in tea-kettles this lime forms an internal crust, which is termed 'rock.' Such incrustation hinders the transmission of heat through the metal of a boiler, and is injurious in various ways. But there are known means of preventing its formation, and in the 'steam engine of the future,' it is an indispensable feature that these means shall be embodied.

"The application of the steam engine to the propulsion of carriages, omnibuses, and cabs, is now only hindered by its too heavy weight and too high cost. Asphalt pavements, which are objectionable for horses, afford for steam carriages a surface as eligible for easy traction as a railway, and without any countervailing fault. All wheeled vehicles, whether required to travel at a high or a low speed, will be propelled by steam instead of horses as soon as the steam engine is made sufficiently light and sufficiently cheap to warrant the substitution. Life boats, instead of being open boats propelled by a number of men, should be decked boats propelled by a steam engine, and managed by only two men, one to steer the boat and the other to attend to the engine. Such boats should be propelled by a water jet which will always act, whatever may be the roughness of the sea, and whether the stern of the boat is in or out of the water. The use of the steam engine for irrigation in connection with the centrifugal pump is an application of which the sphere is limited only by the cost and the deficient portability of the apparatus. To render the class of small engines so much more portable, so much more simple, and so much less costly as to remove the existing impediments to their use, may certainly be accounted one of the most important problems of the present time, and I trust it is not presumptuous to hope that the cursory hints here given may accelerate the desired solution.

* "The Steam Engine of the Future, and the Future of the Steam Engine." By John Bourne, C.E. London: John Bourne & Co., 66 Mark-lane. 1879.—From *Foreman Engineer and Draughtsman.*

Comparative Longevity.

Herr Max Waldstein, of the Statistical Department at Vienna, says, in a recently published pamphlet, that the number of people in Europe who are upward of 90 years old is 12,831, of whom 60,203 are women. Of those who are over 100 years of age, there are 241 women and 161 men in Italy, 229 women and 183 men in Austria, and 526 women and 524 men in Hungary. There are in Austria 1,508,359 persons over 60 years of age, comprising 7·5 per cent of the whole population. It is found that the percentage of old people is much higher among the Germans than among the Slavs. In the German provinces of Upper Austria and Salzburg it is 11·5, while in Galicia it is only 4. In Hungary there are more old men than old women, which is explained by the fact that the excess of women over men is less in Hungary than in other countries. According to Herr Waldstein there are in Austria 100 women and 86 men who are 100 years old, 41 women and 37 men who are 101, and 88 women and 60 men who are upwards of 101 years of age.

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